APPENDIX A

AIR QUALITY ASSESSMENT

Draft Air Quality Assessment

Stockton Ave Mixed Use Development Project

San Jose, California

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July 2015

1.0 Air Quality

The air quality evaluation for the project was performed based on guidance provided by the Bay Area Air Quality Management District (BAAQMD). This assessment evaluates the potential air quality and public health impacts of the proposed Stockton Ave Mixed Use Development Project (the project) in San Jose. This analysis considers both the operational and the construction effects on air quality and public health, and evaluates operational emissions, construction emissions, and potential health risks from toxic air contaminants.

1.1.1 Setting

1.1.1.1 Meteorology

The project site is located in the city of San Jose. The project site is bordered by Stockton Ave to the west, and the Union Pacific Railroad tracks to the east. The site is north of West Santa Clara St., and south of West Julian St. The site is currently developed with light commercial facilities. The site is in the San Francisco Bay Area Air Basin, which is comprised of the nine Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. While the other counties are fully included in the air basin, Sonoma County and Solano County are only included in part, by their southern portion and southwestern portion, respectively. Air quality in the region is affected by natural factors such as proximity to the Bay and ocean, topography, meteorology, and existing air pollution sources.

The Bay Area is characterized by the Mediterranean type climate with warm, dry summers and cool, wet winters. The terrain of the project area influences both the climate and air pollution potential. The City of San Jose lies in the Santa Clara Valley climatological sub-region of the Bay Area Air Basin. The northwest-southeast oriented Santa Clara Valley is bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, the San Francisco Bay to the north, and the convergence of the Gabilan Range and the Diablo Range to the south. Winter temperatures are mild, except for very cool but generally frostless mornings. At the northern end of the Santa Clara Valley, the San Jose Airport reports mean maximum temperatures ranging from the high 70s to the low 80s during the summer to the high 50s-low 60s during the winter, and mean minimum temperatures ranging from the high 50s during the summer to the low 40s during the winter. Further inland, where the moderating effect of the Bay is not as strong, temperature extremes are greater.

The wind patterns in the Valley are influenced greatly by the terrain, resulting in a prevailing flow roughly parallel to the Valley's northwest-southeast axis with a north-northwesterly ocean breeze that flows up the valley in the afternoon and early evening and a light south-southeasterly flow during the late evening and early morning. In the summer, a convergence zone is sometimes observed in the southern end of the Valley between Gilroy and Morgan Hill when air flowing from the Monterey Bay through the Pajaro Gap is channeled northward into the south end of the Santa Clara Valley and meets with the prevailing north-northwesterly winds. Speeds are greatest in the spring and summer; nighttime and early morning hours have light winds and are frequently calm in all seasons while summer afternoons and evenings can be windy.

Air pollution potential in the Santa Clara Valley is high. The valley has a large population and a complex mix of stationary and mobile sources, making it a major source of carbon monoxide, particulate matter, oxides of nitrogen, and volatile organic compounds (precursors of photochemical air pollution). In addition, photochemical pollution precursors from San Francisco, San Mateo, and Alameda counties can be carried along by the prevailing winds to the Santa Clara Valley. Geographically, the valley tends to channel pollutants to the southeast because of its northwest/southeast orientation and its narrowing to the southeast.

There are meteorological factors that have an effect on emissions levels, as well. On summer days, pollutants can be recirculated by the prevailing north-westerly winds in the afternoon and the light flow in the late evening and early morning. This recirculation increases the impact of emissions significantly. Inversions, created by warm, stable air aloft that limits the vertical dispersion of air pollutants, increase the emissions impact in all seasons. During days in the late fall and winter, clear, calm and cold conditions associated with a strong surface-based temperature inversion tend to prevail, which can result in high levels of particulate and carbon monoxide. Though they can be found during all seasons in the Bay Area, inversions are particularly prevalent in the summer months when they are present about 90 percent of the time, both in the morning and in the afternoon.

1.1.1.2 Criteria Air Pollutants

Evaluation of air quality generally focuses on five criteria pollutants that are most commonly measured and regulated: carbon monoxide (CO), ground level ozone (O_3) formed through reactions of nitrogen oxides and reactive organic gases, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and suspended particulate matter (i.e., PM_{10} and $PM_{2.5}$). In the Bay Area, ozone and particulate matter are the pollutants of greatest concern since measured air pollutant levels exceed these concentrations at times. Table 1.1-1 below identifies the characteristics, health effects and typical sources of these major air pollutants.

The Bay Area Air Quality Management District is primarily responsible for assuring that the national and state ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, promoting air quality research, conducting public education campaigns, and other activities.

1.1.1.3 Air Quality Monitoring Data

Air quality in the region is caused by the rate of pollutant emissions and meteorological conditions. Meteorological conditions such as wind speed, atmospheric stability, and mixing height may all affect the atmosphere's ability to mix and disperse pollutants. Long-term variations in air quality typically result from changes in air pollutant emissions, while frequent, short-term variations result from changes in atmospheric conditions. The San Francisco Bay Area is considered to be one of the cleanest metropolitan areas in the country with respect to air quality. BAAQMD monitors air quality conditions at more than 30 locations throughout the Bay Area. The closest monitoring station to the project is the San Jose (Central) site. Summarized air pollutant data for this station is shown in Table 1.1-2. This table shows the highest air pollutant concentrations measured at this station in the most recent 5 year period.

Table 1.1-1
Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone (O_3)	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive hydrocarbons and oxides of nitrogen). Often called photochemical smog. Highest concentrations of ozone are found downwind of urban areas.	▪ Respiratory function impairment.	Sources of ozone precursors (nitrogen oxides and reactive hydrocarbons) are combustion sources, such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide (CO)	Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels. CO concentrations are highest in the winter, when radiation inversions over large areas can limit vertical dispersion.	▪ Impairment of oxygen transport in the bloodstream. ▪ Aggravation of cardiovascular disease. ▪ Fatigue, headache, confusion, dizziness. ▪ Can be fatal in the case of very high concentrations.	Automobile exhaust, combustion of fuels, combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide (NO_2)	Reddish-brown gas that discolors the air, formed during combustion. Nitrogen dioxide levels in California have decreased in recent years due to improved automobile emissions. Ambient standards are typically not exceeded in NCCAB.	▪ Increased risk of acute and chronic respiratory disease.	Automobile and diesel truck exhaust, industrial processes, fossil-fuel use in numerous facility sectors. Also formed via atmospheric reactions.
Sulfur Dioxide (SO_2)	Sulfur dioxide is a colorless gas with a pungent, irritating odor. Ambient standards for sulfur dioxide are rarely exceeded in the NCCAB.	▪ Aggravation of chronic obstruction lung disease. ▪ Increased risk of acute and chronic respiratory disease.	Diesel vehicle exhaust, combustion of liquid fossil fuels in various industrial processes.
PM_{10} & $PM_{2.5}$	Solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time. PM_{10} is particulate matter with diameter less than 10 microns. $PM_{2.5}$ is particulate matter with diameter less than 2.5 microns. $PM_{2.5}$ has been found to be more harmful to humans.	▪ Aggravation of chronic disease and heart/lung disease symptoms.	Combustion, automobiles, field burning, factories and unpaved roads. Also, formed secondarily by photochemical processes of combustion emissions. $PM_{2.5}$ is primarily a secondary pollutant.

Table 1.1-2 Highest Measured Air Pollutant Concentrations at San Jose Central Monitoring Station						
Pollutant	Average Time	Measured Air Pollutant Levels				
		2010	2011	2012	2013	2014
San Jose Central Monitoring Station						
Ozone (O_3) ppb	1-Hour	126	98	101	93	89
	8-Hour	86	67	62	79	66
Carbon Monoxide (CO) ppm	1-Hour	2.8	2.5	2.6	3.1	2.4
	8-Hour	2.2	2.3	1.9	2.5	1.9
Nitrogen Dioxide (NO_2) ppb	1-Hour	64	61	67	59	58
	Annual	14	15	13	15	13
Sulfur Dioxide (SO_2) ppb	1-Hour	4.9	7.2	7.9	2.5	3
	24-Hour	1.8	2.4	2.8	1.4	0.9
Respirable Particulate Matter (PM_{10}) ug/m3	24-Hour	47	44	60	58	55
	Annual	19.5	19.2	18.8	22.3	19.9
Fine Particulate Matter ($PM_{2.5}$) ug/m3	24-Hour	41.5	50.5	38.4	57.7	60.4
	Annual	8.8	9.9	9.1	12.4	8.4

Notes: ppm = parts per million and ug/m^3 = micrograms per cubic meter
ND = data not available.
San Jose Central for all pollutants.
Source: BAAQMD Air Quality Summaries for 2010, 2011, 2012, 2013, 2014.

1.1.1.4 Toxic Air Contaminants (TACs)

Toxic air contaminants (TACs) are a broad class of compounds known to cause various acute, chronic, and cancer related health impacts. They include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and can be caused by industry, agriculture, fuel combustion, and commercial operations. TACs are typically found in low concentrations, even near their source; for example, while diesel particulate matter and benzene may be present near a freeway, the concentration of these materials in the air is typically low. However, chronic exposure to these low levels can result in adverse health effects. As a result, TACs are regulated at the local, state, and federal level.

BAAQMD initiated its Community Air Risk Evaluation (CARE) program in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area. The program examines TAC emissions from: point sources; area sources; on-road mobile sources, such as cars and trucks; and off-road mobile sources, such as construction equipment, trains, and aircraft. The CARE program focuses on Diesel Particulate Matter (DPM) emissions, which is the major contributor to airborne health risk in California. Its goal is to identify areas with high emissions of TACs that have sensitive populations nearby, then reduce exposure to TACs through new regulations, incentive funding, and other programs.

In Phase I of the program, a 2-kilometer by 2-kilometer gridded inventory of TAC emissions was developed for the year 2000. The data were then updated to include 2005 emission data. This emissions inventory was risk-weighted to reflect the differences in potency of the various TACs. For example, benzene has far higher cancer potency than many other compounds, such as methyl tertiary butyl ether (MTBE). In contrast, while DPM is not as potent as benzene, DPM emissions are much more prevalent. The Phase I study identifies diesel emissions from heavy-duty trucks as a major source of TAC emissions and identifies programs available to reduce these emissions.

In Phase II of the CARE program, BAAQMD is performing regional and local-scale modeling to determine the significant sources of DPM and other TAC emissions locally in priority communities, as well as for the entire Bay Area. The BAAQMD has partnered with CARB, the Port of Oakland, the Pacific Institute, the West Oakland Environmental Indicators Project, and major railroads to prepare source or region-specific health risk assessments.

One highlight of the CARE program is the development of a Mitigation Action Plan, in which risk reduction activities are focused on the most at-risk communities. This plan identified six different at-risk communities that would benefit from targeted mitigation, based on TAC emissions and presence of sensitive land uses. San Jose is not located in any of these at-risk communities.

In Phase III, BAAQMD plans to conduct an extensive exposure assessment to identify and rank the communities as to their potential TAC exposures and determine the types of activities that place the communities at highest risk. BAAQMD will also pursue additional mitigations and attempt to develop a metric to measure the effectiveness of these efforts. The new BAAQMD CEQA Guidelines included new significance thresholds for community risk and hazards that originated from this process. These new thresholds address both project (i.e., single-source) and cumulative exposures.

Smoke from residential wood combustion can also be a source of TACs. There are typically higher levels of wood smoke emissions during wintertime when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind, the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

1.1.1.5 Attainment Status

The EPA administers the National Ambient Air Quality Standards (NAAQS) under the Federal Clean Air Act. EPA sets the NAAQS and determines if areas meet those standards. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. Areas that do not violate ambient air quality standards are considered to have attained the standard. EPA has classified the region as a nonattainment area for the 8-hour O_3 standard and the 24-hour $PM_{2.5}$ standard. The Bay Area has met the CO standards for over a decade and is classified as an attainment area by the U.S. EPA. The U.S. EPA has deemed the region as attainment/unclassified for all other air pollutants, which include PM_{10}. At the State level, the Bay Area is considered nonattainment for ozone, PM_{10} and $PM_{2.5}$.

1.1.1.6 Sensitive Receptors

Sensitive receptors consist of groups of people more affected by air pollution than others. CARB has identified the following as the most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases.

Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare centers, elder care facilities, elementary schools, and parks. Sensitive receptors in the project area consist of single and multi-family residential to the west at a distance of ~550 feet, and multi-family residential to the southwest at a distance of ~ 375 ft. There were no identified hospitals, care facilities, or daycare facilities within 1,000 feet of the project site. The nearest school is the Park Ave pre-school site located ~2,000 feet to the west.

1.1.2 Regulatory Environment

The Federal Clean Air Act (CAA) is the primary federal law regulating air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the federal level, the U.S. Environmental Protection Agency (US EPA) administers the CAA. The California Clean Air Act is administered by the California Air Resources Board (CARB) at the state level and by the appropriate air quality management district at the regional and local levels. The BAAQMD regulates air quality at the regional level, which includes the nine-county Bay Area. Following is a discussion of regulation programs and policies.

1.1.2.1 Federal

As required by the Federal Clean Air Act (CAA), National Ambient Air Quality Standards (NAAQS) have been established for seven major air pollutants: carbon monoxide, nitrogen oxides, ozone, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur oxides, and lead.

United States Environmental Protection Agency

The U.S. EPA is responsible for enforcing the CAA. The U.S. EPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). NAAQS are required under the CAA. The U.S. EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by CARB.

In addition to major pollutants, the U.S. EPA regulates Hazardous Air Pollutants (HAPs). One means by which the U.S. EPA addresses HAP exposure is through the National Emission Standards for Hazardous Air Pollutants (NESHAPs)[1], which include source-specific regulations that limit allowable emissions of such pollutants.

The U.S. EPA recently adopted a new, more stringent $PM_{2.5}$ standard of 35 μg/m^3 for 24-hour exposures based on a review of the latest new scientific evidence. At the same time, U.S. EPA revoked the annual PM_{10} standard due to a lack of scientific evidence correlating long-term exposures of ambient PM_{10} with adverse health effects.

[1] The NESHAPs are promulgated under Title 40 of the Code of Federal Regulations (CFR), Parts 61 & 63.

1.1.2.2 State

California Air Resources Board

In California, CARB, which is part of the California Environmental Protection Agency, is responsible for meeting the state requirements of the CAA, administering the California Clean Air Act (CCAA), and establishing the California Ambient Air Quality Standards (CAAQS). The CCAA requires all air districts in the state to endeavor to achieve and maintain CAAQS. CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB has established passenger vehicle fuel specifications and oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level. CARB also conducts or supports research into the effects of air pollution on the public and develops innovative approaches to reducing air pollutant emissions. Both state and federal standards are summarized in Table 1.1-3.

State Ambient Air Quality Standards

The state also regulates Toxic Air Contaminants (TACs) separately from those pollutants with CAAQS primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). A discussion of TACs was provided earlier in this section.

1.1.2.3 Regional

Bay Area Air Quality Management District

BAAQMD is primarily responsible for assuring that the national and state ambient air quality standards are attained and maintained in the Bay Area as described above.

Bay Area Clean Air Plan

To protect public health, BAAQMD has adopted plans to achieve ambient air quality standards. BAAQMD must continuously monitor its progress in implementing attainment plans and must periodically report to CARB and the EPA. It must also periodically revise its attainment plans to reflect new conditions and requirements.

Table 1.1-3
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]
Ozone	8-hour	0.07 ppm	0.075 ppm
	1-hour	0.09 ppm	—[c]
Carbon monoxide	8-hour	9 ppm	9 ppm
	1-hour	20 ppm	35 ppm
Nitrogen dioxide	Annual	0.03 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm[d]
Sulfur dioxide[e]	Annual	—	0.03 ppm
	24-hour	0.04 ppm	0.14 ppm

Table 1.1-3
Ambient Air Quality Standards

	1-hour	0.25 ppm	0.075 ppm
PM_{10}	Annual	20 µg/m^3	--
	24-hour	50 µg/m^3	150 µg/m^3
$PM_{2.5}$	Annual	12 µg/m^3	15 µg/m^3
	24-hour	—	35 µg/m^3 [f]

Notes:
ppm = parts per million   µg/m^3 = micrograms per cubic meter

[a] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average.

[b] National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3.
Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

[c] The national 1-hour ozone standard was revoked by EPA on June 15, 2005.

[d] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100ppm (effective January 22, 2010).

[e] On June 2, 2010, the EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until one year following EPA initial designations of the new 1-hour SO_2 NAAQS.

[f] EPA lowered the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 in 2006. EPA designated the Bay Area as nonattainment of the $PM_{2.5}$ standard on October 8, 2009. The effective date of the designation is December 14, 2009, and the Air District has three years to develop a SIP that demonstrates the Bay Area will achieve the revised standard by December 14, 2014.

Source: CARB, 2015

In 1991, the BAAQMD, Metropolitan Transportation Commission (MTC), and Association of Bay Area Governments (ABAG) prepared the Bay Area 1991 Clean Air Plan. This air quality plan addresses the California Clean Air Act. Updates are developed approximately every three years. The plans are meant to demonstrate progress toward meeting the more stringent 1-hour ozone California AAQS. In 2010, BAAQMD adopted the Bay Area 2010 Clean Air Plan. This Clean Air Plan updates the most recent ozone plan, the 2005 Ozone Strategy. Unlike previous Bay Area Clean Air Plans, the 2010 Clean Air Plan is a multi-pollutant air quality plan addressing four categories of air pollutants:

- Ground-level ozone and the key ozone precursor pollutants (reactive organic gases and NO_x), as required by State law;
- Particulate matter, primarily $PM_{2.5}$, as well as the precursors to secondary $PM_{2.5}$;
- Toxic air contaminants; and
- Greenhouse gases (GHGs).

While the Clean Air Plan addresses State requirements, it also provides the basis for developing future control plans to meet federal requirements (NAAQS) for ozone and $PM_{2.5}$. The region was required to prepare (by December 2012) a federally enforceable plan to meet the NAAQS for $PM_{2.5}$. In addition, U.S. EPA will provide formal designations for O_3 under the NAAQS. These new standards will trigger new planning requirements for the Bay Area and more stringent federally enforceable control measures.

While previous Clean Air Plans have relied upon a combination of stationary and transportation control measures, the 2010 Clean Air Plan adds two new types of control measures: 1) Land Use and Local Impact Measures, and 2) Energy and Climate Measures. These types of measures would indirectly reduce air pollutant and GHG emissions through reductions in vehicle use and energy usage. In addition, the plan includes Further Study Measures, which will be evaluated as potential control measures.

The Bay Area 2010 Clean Air Plan proposes expanded implementation of transportation control measures (TCMs) and includes public outreach programs designed to educate the public about air pollution in the Bay Area and promote individual behavior changes that improve air quality. New measures in the Clean Air Plan are aimed at helping guide land use policies that would indirectly reduce air pollutant emissions. Some of these measures or programs rely on local governments for implementation. The clean air planning efforts for O_3 also will reduce PM_{10} and $PM_{2.5}$, as a substantial amount of particulate matter comes from combustion emissions such as vehicle exhaust. Conversely, strategies to reduce O_3 precursor emissions will reduce secondary formation of PM_{10} and $PM_{2.5}$.

The Bay Area 2001 Ozone Attainment Plan was prepared to achieve the 1-hour NAAQS for ozone. Since that plan was submitted, the region was designated as a marginal nonattainment area for the 8-hour ozone NAAQS, and the 1-hour ozone NAAQS was revoked. This plan was a proposed revision to the Bay Area part of California's plan (State Implementation Plan or SIP) to achieve the 1-hour ozone NAAQS. The plan was prepared in response to EPA's partial approval and partial disapproval of the Bay Area's 1999 Ozone Attainment Plan. This plan contains the most recent federally required control measures to reduce ozone concentrations. EPA plans to designate the Bay Area as nonattainment with respect to the new 2008 8-hour ozone NAAQS. This would require the region to develop a new Ozone Attainment Plan to meet this standard. A new plan would likely contain many of the components listed in the 2010 Clean Air Plan described above, since that plan addresses the more stringent State ozone standards.

There is no state requirement for a clean air plan addressing PM_{10} or $PM_{2.5}$ regulatory requirements. Currently, BAAQMD is developing a federally required plan to address the $PM_{2.5}$ NAAQS. In addition, the BAAQMD's 2010 Clean Air Plan addresses control of PM_{10} and $PM_{2.5}$. The clean air planning efforts for ozone will also reduce PM_{10} and $PM_{2.5}$, since a substantial amount of this air pollutant comes from combustion emissions such as vehicle exhaust. In addition, California's Senate Bill 656 (SB 656, Sher, 2003) that amended Section 39614 of the Health and Safety Code, required further action by CARB and air districts to reduce public exposure to PM_{10} and $PM_{2.5}$. Efforts identified by the BAAQMD in response to SB 656 are primarily targeting reductions in wood smoke emissions, adoption of new rules to further reduce NO_x and particulate matter from internal combustion engines, and reductions in particulate matter from commercial charbroiling activities.

1.1.2.4 Local

The City of San Jose General Plan (*Envision San Jose 2040, City Planning Division, October 2011*) presents the following General Plan goals for the community with respect to air quality.

Goal MS-10 – Air Pollutant Emission Reduction
Minimize air pollutant emissions from new and existing development.

Policies – Air Pollutant Emission Reduction

MS-10.1 Assess projected air emissions from new development in conformance with the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines and relative to state and federal standards. Identify and implement feasible air emission reduction measures.

MS-10.2 Consider the cumulative air quality impacts from proposed developments for proposed land use designation changes and new development, consistent with the region's Clean Air Plan and State law.

MS-10.3 Promote the expansion and improvement of public transportation services and facilities, where appropriate, to both encourage energy conservation and reduce air pollution.

MS-10.4 Encourage effective regulation of mobile and stationary sources of air pollution, both inside and outside of San José. In particular, support Federal and State regulations to improve automobile emission controls.

MS-10.5 In order to reduce vehicle miles traveled and traffic congestion, require new development within 2,000 feet of an existing or planned transit station to encourage the use of public transit and minimize the dependence on the automobile through the application of site design guidelines and transit incentives.

MS-10.6 Encourage mixed land use development near transit lines and provide retail and other types of service oriented uses within walking distance to minimize automobile dependent development.

MS-10.7 Encourage regional and statewide air pollutant emission reduction through energy conservation to improve air quality.

MS-10.8 Minimize vegetation removal required for fire prevention. Require alternatives to discing, such as mowing, to the extent feasible. Where vegetation removal is required for property maintenance purposes, encourage alternatives that limit the exposure of bare soil.

MS-10.9 Foster educational programs about air pollution problems and solutions.

Actions – Air Pollutant Emission Reduction

MS-10.10 Actively enforce the City's ozone-depleting compound ordinance and supporting policy to ban the use of chlorofluorocarbon compounds (CFCs) in packaging and in building construction and remodeling. The City may consider adopting other policies or ordinances to reinforce this effort to help reduce damage to the global atmospheric ozone layer.

MS-10.11 Enforce the City's wood-burning appliance ordinance to limit air pollutant emissions from residential and commercial buildings.

MS-10.12 Increase the City's alternative fuel vehicle fleet with the co-benefit of reducing local air emissions. Implement the City's Environmentally Preferable Procurement Policy (Council Policy 4-6) and Pollution Prevention Policy (Council Policy 4-5) in a manner that reduces air emissions from municipal operations. Support policies that reduce vehicle use by City employees.

MS-10.13 As a part of City of San José Sustainable City efforts, educate the public about air polluting household consumer products and activities that generate air pollution. Increase public awareness about the alternative products and activities that reduce air pollutant emissions.

MS-10.14 Review and evaluate the effectiveness of site design measures, transit incentives, and new transportation technologies and encourage those that most successfully reduce air pollutant emissions.

Goal MS-11 – Toxic Air Contaminants
Minimize exposure of people to air pollution and toxic air contaminants such as ozone, carbon monoxide, lead, and particulate matter.

<u>Policies – Toxic Air Contaminants</u>

MS-11.1 Require completion of air quality modeling for sensitive land uses such as new residential developments that are located near sources of pollution such as freeways and industrial uses. Require new residential development projects and projects categorized as sensitive receptors to incorporate effective mitigation into project designs or be located an adequate distance from sources of toxic air contaminants (TACs) to avoid significant risks to health and safety.

MS-11.2 For projects that emit toxic air contaminants, require project proponents to prepare health risk assessments in accordance with BAAQMD-recommended procedures as part of environmental review and employ effective mitigation to reduce possible health risks to a less than significant level. Alternatively, require new projects (such as, but not limited to, industrial, manufacturing, and processing facilities) that are sources of TACs to be located an adequate distance from residential areas and other sensitive receptors.

MS-11.3 Review projects generating significant heavy duty truck traffic to designate truck routes that minimize exposure of sensitive receptors to TACs and particulate matter.

MS-11.4 Encourage the installation of appropriate air filtration at existing schools, residences, and other sensitive receptor uses adversely affected by pollution sources.

MS-11.5 Encourage the use of pollution absorbing trees and vegetation in buffer areas between substantial sources of TACs and sensitive land uses.

Actions – Toxic Air Contaminants

MS-11.6 Develop and adopt a comprehensive Community Risk Reduction Plan that includes: baseline inventory of toxic air contaminants (TACs) and particulate matter smaller than 2.5 microns (PM2.5), emissions from all sources, emissions reduction targets, and enforceable emission reduction strategies and performance measures. The Community Risk Reduction Plan will include enforcement and monitoring tools to ensure regular review of progress toward the emission reduction targets, progress reporting to the public and responsible agencies, and periodic updates of the plan, as appropriate.

MS-11.7 Consult with BAAQMD to identify stationary and mobile TAC sources and determine the need for and requirements of a health risk assessment for proposed developments.

MS-11.8 For new projects that generate truck traffic, require signage which reminds drivers that the State truck idling law limits truck idling to five minutes.

Goal MS-12 – Objectionable Odors
Minimize and avoid exposure of residents to objectionable odors.

Policies – Objectionable Odors

MS-12.1 For new, expanded, or modified facilities that are potential sources of objectionable odors (such as landfills, green waste and resource recovery facilities, wastewater treatment facilities, asphalt batch plants, and food processors), the City requires an analysis of possible odor impacts and the provision of odor minimization and control measures as mitigation.

MS-12.2 Require new residential development projects and projects categorized as sensitive receptors to be located an adequate distance from facilities that are existing and potential sources of odor. An adequate separation distance will be determined based upon the type, size and operations of the facility.

Goal MS-13 – Construction Air Emissions
Minimize air pollutant emissions during demolition and construction activities.

Policies – Construction Air Emissions

MS-13.1 Include dust, particulate matter, and construction equipment exhaust control measures as conditions of approval for subdivision maps, site development and planned development permits, grading permits, and demolition permits. At minimum, conditions shall conform to construction mitigation measures recommended in the current BAAQMD CEQA Guidelines for the relevant project size and type.

MS-13.2 Construction and/or demolition projects that have the potential to disturb asbestos (from soil or building material) shall comply with all the requirements of the California Air Resources Board's air toxics control measures (ATCMs) for Construction, Grading, Quarrying, and Surface Mining Operations.

MS-13.3 Require subdivision designs and site planning to minimize grading and use landform grading in hillside areas.

Actions – Construction Air Emissions

MS-13.4 Adopt and periodically update dust, particulate, and exhaust control standard measures for demolition and grading activities to include on project plans as conditions of approval based upon construction mitigation measures in the BAAQMD CEQA Guidelines.

MS-13.5 Prevent silt loading on roadways that generates particulate matter air pollution by prohibiting unpaved or unprotected access to public roadways from construction sites.

MS-13.6 Revise the grading ordinance and condition grading permits to require that graded areas be stabilized from the completion of grading to commencement of construction.

1.1.3 Impacts and Mitigation

1.1.3.1 Thresholds of Significance

In accordance with CEQA Guidelines, a project impact would be considered significant if the project would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

In June 2010, the BAAQMD adopted significance thresholds for agencies to use to assist with environmental review of projects. These thresholds were designed to establish the level at which BAAQMD believed air pollutant emissions would cause significant impacts under CEQA. The BAAQMD's recommended significance thresholds were included in its updated CEQA Guidelines (updated May 2012). In March 2012, the Alameda County Superior Court ruled that BAAQMD needed to comply with CEQA prior to adopting the Guidelines. The Superior Court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering BAAQMD to set aside the thresholds and cease dissemination of them until BAAQMD complied with CEQA. On appeal, the First Appellate District Court of Appeal reversed the trial court's decision. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review, and the matter is currently pending. In view of the trial court's order which remains in place pending final resolution of the case, BAAQMD is no longer recommending that their thresholds be used as a general measure of project's significant air quality impacts; however, BAAQMD noted that lead agencies may rely on its updated CEQA Guidelines (May 2012) for assistance in calculating air emissions, obtaining information regarding health impacts of air pollutants, and identifying potential mitigation measures.

The District Court has independently reviewed the BAAQMD recommended thresholds from June 2010, including BAAQMD's Justification Report, which explains the agency's reasoning for adopting the thresholds, and determined that they are supported by substantial evidence. Therefore, these are appropriate for use in determining significance in the environmental review of this project. The BAAQMD recommended significance thresholds are provided in Table 1.1-4 below.

Table 1.1-4
Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
GHG	1,100* Metric Tons	1,100* Metric Tons	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	10 per one million	10 per one million	
Chronic or Acute Hazard Index	1.0	1.0	
Incremental annual average $PM_{2.5}$	0.3 $\mu g/m^3$	0.3 $\mu g/m^3$	
Health Risks and Hazards for Sensitive Receptors (Cumulative from All Sources within 1,000-Foot Zone of Influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per 1 million		
Chronic Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 $\mu g/m^3$		

Notes: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (μm) or less, and $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5μm or less. Source: BAAQMD, 2014.
* Proposed operational significance level.

1.1.3.2 Consistency with Air Quality Plan

The BAAQMD, with assistance from the Association of Bay Area Governments and the Metropolitan Transportation Commission, has prepared and will implement specific plans to meet the applicable laws, regulations, and programs. Among them are the *Carbon Monoxide*

Maintenance Plan (1994), the *2001 Ozone Attainment Plan*, and the *Bay Area 2010 Clean Air Plan*. The BAAQMD has also developed CEQA guidelines to assist lead agencies in evaluating the significance of air quality impacts. In formulating compliance strategies, the BAAQMD relies on planned land uses established by local general plans. When a project proposes to change planned uses by requesting a general plan amendment, the project may depart from the assumptions used to formulate BAAQMD in such a way that the cumulative result of incremental changes may hamper or prevent the BAAQMD from achieving its goals. This is because land use patterns influence transportation needs, and motor vehicles are the primary source of air pollution. The proposed project would not conflict with implementation of control measures contained in the Bay Area 2010 Clean Air Plan since it does not propose any changes in use or long-term traffic conditions. The project, therefore, would not conflict with clean air planning efforts.

1.1.3.3 Violation of an Air Quality Standard, Substantial Contribution to Air Quality Violation, or Exposure of Existing Sensitive Receptors to Substantial Air Pollutants

The Bay Area is considered a non-attainment area for ground-level ozone and fine particulate matter ($PM_{2.5}$) under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM_{10} under the CCAA, but not the Federal act. The area has attained both State and Federal ambient air quality standards for carbon monoxide.

The nearest residential sensitive receptors are located approximately 450 feet to the south of the project boundary.

<u>*Operational Emissions*</u>

The operational emissions for the (post-construction) project would be solely associated with vehicular emissions from residential and retail related type facilities. Table 1.1-5 presents the estimated daily operational emissions.

Carbon monoxide emissions from traffic generated by operation of the post-construction project would be the pollutant of greatest concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Air pollutant monitoring data indicate that carbon monoxide levels have been at healthy levels (i.e., below state and federal standards) in the Bay Area since the early 1990s. As a result, the region has been designated as attainment for the standard. There is an ambient air quality monitoring station in San Jose that measures carbon monoxide concentrations. The highest measured level over any 8-hour averaging period during the last three years is less than or equal to 2.5 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. Intersections affected by the project operational traffic would have volumes less than the BAAQMD screening criteria and thus would not cause a violation of an ambient air quality standard or have a considerable contribution to cumulative violations of these standards.[2]

Based on the discussion above, operation of the project is not expected to exceed the significant operational thresholds, violate any air quality standard, contribute substantially to an

[2] For a land-use project type, the BAAQMD *CEQA Air Quality Guidelines* state that a proposed project would result in a less than significant impact to localized carbon monoxide concentrations if the project would not increase traffic at affected intersections to more than 44,000 vehicles per hour.

existing/projected air quality violation, or expose sensitive receptors to substantial air pollutant levels.

Table 1.1-5
Estimated Operational Emissions

Category	ROG	NO_x	PM_{10} (Exhaust)	$PM_{2.5}$ (Exhaust)	CO	SO_x	CO_2e
Tons per Year							
Operational Emissions	1.85	2.15	0.052	0.05	10.74	0.019	3.73
BAAQMD Thresholds	**10**	**10**	**15**	**10**	**-**	**-**	**4.6 SP/yr**
Exceed Threshold?	No	No	No	No	na	na	No
Lbs/day (normalized per 365 days/yr)							**Metric Tons/Yr**
Operational Emissions	10.14	11.78	0.28	0..27	58.85	0.104	3.73
BAAQMD Thresholds	**54**	**54**	**82**	**54**	**na**	**na**	**4.6 SP/yr**
Exceed Threshold?	No	No	No	No	na	na	No
* CO_2e significance threshold is based on MT CO_2e/SP/yr (residents+employees) assuming 544 residents and employees.							

<u>Construction Emissions</u>

During the construction phase of the project, emissions of air pollutants are expected to occur from the demolition activities, excavation, grading, new building construction, paving and from the application of architectural coatings. During demolition, excavation, grading and some building construction activities, fugitive dust could be generated. Estimated emissions of air pollutants during the construction phase of the project were compared to the BAAQMD significance criteria, which include thresholds based on 1) total mass emissions on a pound per day basis, and 3) health risk based thresholds for diesel particulate matter and a concentration threshold for $PM_{2.5}$ on an annual basis. Construction activity is anticipated to include each of these comparisons and are discussed separately below.

Construction emissions were estimated for the project using CalEEMod (Version 2013.2.2).[3] Data supplied by the project developer was used and supplemented by data from other similar projects and the use of “best engineering estimates” in cases where actual data was not available. Table 1.1-6 presents the construction phase data as well as the types and numbers of construction equipment to be onsite. Table 1.1-7 presents summaries of other relevant construction data that was used for CalEEMod. Construction is expected to occur for a single construction phase up to 18 months (including demolition activities).

[3] CalEEMod is a statewide land use emissions computer model developed to provide a uniform platform to quantify potential criteria pollutant and greenhouse gas emissions.

Table 1.1-6 **Construction Equipment and Support Data**	
Parameter	
Types of construction equipment to be used	Graders, backhoes, excavators, rubber-tired loaders, forklifts, etc.
Demolition (estimated sq.ft.)	~2,000
Cut and Fill (yd^3)	3,500/1,000
Deliveries	Site deliveries will consist of construction materials, concrete, paving materials, etc.

Table 1.1-7 **Construction Period & Activity Data**	
Construction Activity	**18 Month Phase-Order of Implementation***
Demolition	1^{st}
Site Preparation	2^{nd}
Grading	3^{rd}
Building	4^{th}
Paving	5^{th}
Architectural Coating	6^{th}
*some phases may have slight overlaps during the 18 month construction period	

Mass Emission Based Significance Thresholds. Table 1.1-8 reports the estimated construction phase/period emissions, annualized emissions, and average daily emissions (computed by dividing the total annualized construction period emissions by the number of anticipated construction days). Emissions are shown by each construction phase. Per Table 1.1-8, no emissions of criteria pollutants during construction would exceed the BAAQMD daily significance levels, as presented in Table 1.1-4. Details of the emission calculations are provided in Appendix A. As indicated in Table 1.1-8 below, project emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ would not exceed the BAAQMD daily (lb/day) significance thresholds. Thus, the project construction emissions would not be considered significant when compared to the mass emission based significance thresholds.

Table 1.1-8 Estimated Construction Period Emissions							
Status	**ROG**	**NOx**	**PM_{10} (Exhaust)**	**$PM_{2.5}$ (Exhaust)**	**CO**	**SOx**	**CO_2e**
Tons per 18 Month Period							Metric Tons
Unmitigated	3.20	5.29	0.31	0.29	4.94	0.0085	714.9
Lbs/day (Normalized per 18 month period of 392 workdays))							
Unmitigated	16.32	26.99	1.58	1.49	25.20	0.043	-
BAAQMD Thresholds	**54**	**54**	**82**	**54**	**Na**	**na**	**1,100***
Exceed Threshold?	No	No	No	No	na	na	No
* Proposed significance threshold for construction set to operational significance level.							

Concentration Based Significance Thresholds. As previously stated, construction activity is anticipated to include demolition of existing buildings, excavation, grading, building construction, paving and application of architectural coatings. During demolition, excavation, grading and some building construction activities, fugitive dust ($PM_{2.5}$) could be generated. Most of the dust would occur during excavation and grading activities. The amount of dust generated would be highly variable and would be dependent on the size of the area disturbed at any given time, amount of activity, and soil/weather conditions. In addition to the fugitive dust emissions, emissions of combustion $PM_{2.5}$ would also occur. Therefore, in addition to the daily construction emission significance thresholds for combustion emissions, the BAAQMD has also established a concentration based significance threshold for $PM_{2.5}$ of 0.3 ug/m^3 (annual average) for all PM2.5 emissions.

The CalEEMod model provided total $PM_{2.5}$ exhaust emissions for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles) of 0.293 tons for unmitigated emissions for the overall construction period. The on-road emissions are a result of haul truck travel, worker travel and vendor deliveries during construction activities. The default CalEEMod trip length was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were also calculated by CalEEMod as 0.072 tons for the overall construction period.

The U.S. EPA AERMOD dispersion model was used to predict concentrations of $PM_{2.5}$ at existing sensitive receptors in the vicinity of the project site. The AERMOD modeling utilized point sources and a single area source to represent the on-site construction emissions, with the point sources representing the $PM_{2.5}$ exhaust emissions and the area source for fugitive $PM_{2.5}$ dust emissions (refer to Figure 1.1-1). To represent the construction equipment exhaust emissions, 71 equally spaced point sources were placed within the primary construction activity area (see Figure 1.1-1). Each point source had an emission release height of 6.0 feet. The exit temperature and stack velocity were based on an average sized construction engine source. For modeling fugitive (construction dust) $PM_{2.5}$ emissions, an area source covering the construction area was modeled with a near ground level release height of 8.2 feet. Emissions were modeled as occurring daily between 7:00 AM – 5:00 PM. The model used a 5-year data set (2006 - 2010) of hourly AERMOD meteorological data from the San Jose Airport (surface data) and Oakland (upper air data), provided by the BAAQMD. Annual $PM_{2.5}$ concentrations from construction activities were calculated for unmitigated construction emissions for 2016 (maximum dust generating year), based on the 5-year average concentrations based on modeling all five years of meteorological data. $PM_{2.5}$ concentrations were calculated at nearby sensitive receptors at heights representative of the ground level exposures for the single/multi-family homes. For the multistory sensitive receptors, heights of 5, 15 and 25 feet were used.

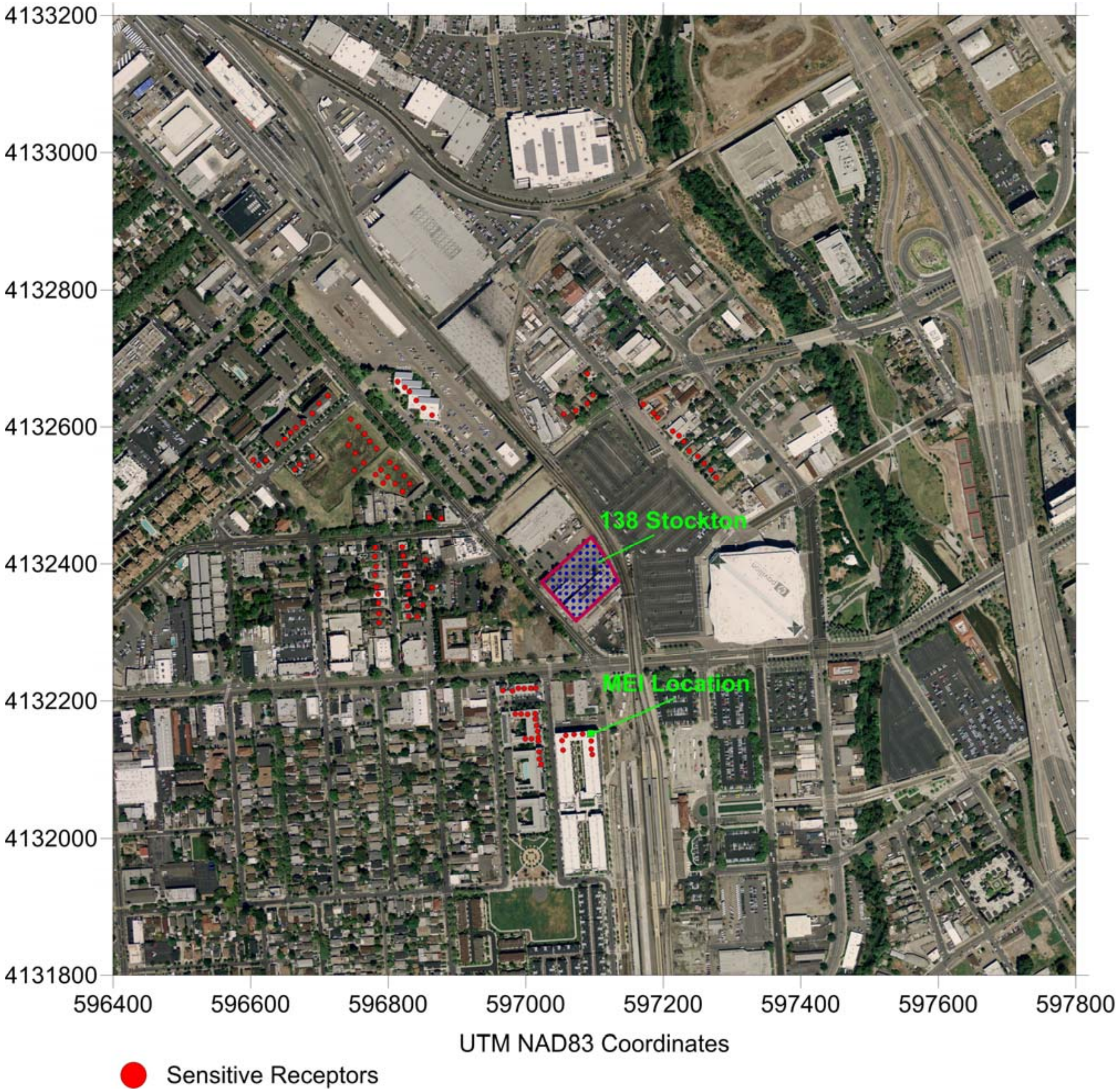
Based on the results of the U.S. EPA AERMOD dispersion modeling, the modeled maximum annual $PM_{2.5}$ concentrations from the construction activities were 0.04 ug/m^3 for unmitigated exhaust and unmitigated fugitive emissions. The fugitive dust $PM_{2.5}$ impacts do not exceed the BAAQMD $PM_{2.5}$ significance threshold level of 0.3 ug/m^3 and therefore, represent an insignificant impact.

Impact

The project would expose existing sensitive receptors to fine particle pollutant concentrations generated during construction of the project as described above. These concentrations are below the BAAQMD significance thresholds and thus, with the implementation of best control measures, would not pose a risk to the health and safety of nearby sensitive receptors.

Figure 1.1-1

Source/Receptor Locations with the MEI



Best Control Measures

AIR-1 The Project shall implement BAAQMD Recommended Best Control Measures for reducing fugitive dust emissions during construction and include in the plans and specifications. These measures are as follows:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two or more times per day;
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered;
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited;
- All vehicle speeds on unpaved roads shall be limited to 15 mph;
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used;
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points;
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation; and
- A publicly visible sign shall be posted with the telephone number and person to contact at the construction site regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Conclusion

The project as designed will not be in conflict with the City's general plan, and with the implementation of best control measures, the potential exposure of sensitive receptors to air pollutants as a result of the project would insure that all concentrations of $PM_{2.5}$ would be minimized to a less-than-significant level.

Health Risk Based Thresholds (Diesel Particulate Matter). Construction equipment and associated heavy-duty truck traffic also generates diesel exhaust (i.e., diesel particulate matter or DPM), which is a TAC. BAAQMD has developed screening tables for evaluating potential impacts from toxic air contaminants emitted at construction projects.[4] The screening tables are described by BAAQMD as "environmentally conservative interim guidance" and are meant to be used to identify potentially significant impacts that should be modeled using refined techniques. These screening tables indicate that construction activities similar to this project could have significant impacts at the distances of nearby residences, with the primary impact being excess cancer risk. Since project construction activities would include demolition, excavation, grading and building construction that would last no longer than ten (18) months and would occur near

[4] *Screening Tables for Air Toxics Evaluation during Construction*, BAAQMD, May 2010.

to neighboring residences, a more refined-level study of community risk assessment was conducted. Because the gross analysis indicated that impacts were possible, a refined analysis was conducted to evaluate whether impact would be significant, and if so, identify the project features or mitigation measures that would be necessary to avoid significant impacts in terms of community risk impacts to nearby sensitive receptors (e.g., adjacent school children and nearby residences).

Much of the emissions would occur during the demolition and grading phases of construction, which would occur over a relatively brief duration. The closest residences to the project site would be exposed to construction emissions, but this brief exposure period would be substantially less than the exposure period typically assumed for health risk analysis which is a 70-year exposure period. However, construction activity would be ongoing to some degree over a period of approximately 18 months.

A screening health risk assessment analysis of the construction impacts from DPM and $PM_{2.5}$ emissions to nearby existing residences was conducted. This risk assessment focused on modeling on-site diesel construction activity using construction period emissions obtained from the CalEEMod model. Construction of the project was assumed to occur over a 18 month period. The CalEEMod model provided total $PM_{2.5}$ exhaust emissions (assumed to be diesel particulate matter) for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles) of 0.293 tons for the overall construction period. The on-road emissions are a result of worker travel and vendor deliveries during building construction. The default CalEEMod trip length was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site.

The U.S. EPA AERMOD dispersion model was used to predict concentrations of DPM at existing sensitive receptors in the vicinity of the project site. As described above, the AERMOD modeling utilized point sources to represent the on-site DPM construction emissions. To represent the construction equipment exhaust emissions, 71 equally spaced point sources were placed within the area of construction activity (see Figure 1.1-1). Each point source had an emission release height of 6.6 feet. The exit temperature and stack velocity were based on an average sized construction engine source. Emissions were modeled as occurring daily between 7 AM - 5 PM. The model used a 5-year data set (2006 - 2010) of hourly meteorological data from the San Jose Airport (surface data) and Oakland (upper air data), provided by the BAAQMD. Annual DPM concentrations from construction activities were predicted for construction unmitigated and mitigated construction emissions for 2016-2017 with the annual average concentrations based on the 5-year average concentrations from modeling five years of meteorological data. DPM concentrations were calculated at nearby sensitive receptors at heights representative of the ground level exposures for the single/multi-family homes (5 feet) while multistory residential units were modeled at 5, 15 and 25 feet in height.

The maximum-modeled DPM concentration occurred in the residential area south of the project (see Figure 1.1-1). Increased cancer risks were calculated using the modeled annual concentrations and BAAQMD recommended risk assessment methods for both a child exposure (3rd trimester through 2 years of age) and for an adult exposure. BAAQMD-recommended exposure parameters were used for the cancer risk calculations.[5]

[5] Bay Area Air Quality Management District (BAAQMD), 2010, *Air Toxics NSR Program Health Risk Screening Analysis Guidelines*, January.

Results of this assessment indicate that, with project construction, the maximum incremental cancer risk at the maximally exposed individual (MEI) would occur at a distance of about 560 feet south from the southwestern edge of the area of disturbance. For unmitigated construction DPM emissions, these impacts would be a child incremental cancer risk of 3.86 in one million and an adult incremental cancer risk of 0.20 in one million. Based on these unmitigated impacts, the project would not have a significant impact with respect to community risk caused by construction activities.

Cumulative Impacts

Cumulative stationary and mobile source impacts were assessed for the residential units that will be constructed as part of the project. As recommended by the BAAQMD (BAAQMD, 2012), to assist in evaluating cumulative risks, permitted stationary sources of TACs near the project site were identified using BAAQMD's Stationary Source Risk and Hazard Analysis Tool for sources near the proposed project. This mapping tool uses Google Earth to identify the location of stationary sources and their estimated screening level cancer risk and hazard impacts.

There are currently no existing major stationary sources within 1,000 feet of the proposed project site. Six minor source facilities are located within 1,000 feet of the site. The BAAQMD risk files show the following for these sources (Table 1.1-9).

Table 1.1-9
Stationary Source Risk Values (BAAQMD)

Source ID	Source Type	Cancer Risk (10^{-6})	Hazard Index	PM2.5
3100	Generator	0.110	0.001	0.005
G7202	Gas Station	0.153	0	n/a
14193	Caltrans Yard	24.29	0.009	0.043
8417	Body Shop	0	0	0
17313	Geo Restoration Unit	0	0	0
11819	Body Shop	0	0	0

The nearest major roadway where the BAAQMD has established screening level risk values is Highway 87, which is located ~2,100 feet towards the east. Highway risk values for this roadway are given for distances up to 1000 feet from the roadway, while the link is approximately 2,100 ft. from the proposed project site. The single link and its associated 1,000 feet risk values, are presented in Table 1.1-10.

Additionally, there is one (1) major roadway in the vicinity of the project site for which the BAAQMD has developed risk values (West Santa Clara St.). These screening values are also presented in Table 1.1-10.

Table 1.1-10 Roadway Risk Values (BAAQMD)								
Hwy ID and Link	6 foot Values				20 foot Values			
	PM2.5	Risk	Chronic HI	Acute HI	PM2.5	Risk	Chronic HI	Acute HI
Hwy 87, Link 535	0.006	0.693	0	0.004	0.006	0.677	0	0.004
W. Santa Clara St. Link 33	0.027	2.892	0.003	0.003	0.026	2.703	0.003	0.003

Railroad Community Risk Impacts

The project site is located adjacent to rail lines used by Caltrain and Amtrak for passenger rail service and a Union Pacific Railroad (UPRR) rail line used for freight service. The northeastern project site boundary is about 15 feet from the nearest rail line and the Diridon train station is about 750 feet south of the project site. Trains traveling on these lines generate TAC and $PM_{2.5}$ emissions from diesel locomotives. Due to the proximity of the rail line to the proposed project, potential community risks to future residents at the proposed project from DPM emissions from diesel locomotive engines were evaluated.

Passenger rail service at the Diridon station include diesel fueled trains for Caltrain, Altamont Commuter Express (ACE), Amtrak-Capitol Corridor, and the Amtrak-Coast Starlight. Based on the current Caltrain schedule, there are 92 trains accessing the station during the weekdays, 32 trains during the weekend, and 4 trains that only run on Saturday. The ACE operates 8 trains daily between Stockton and San José with service terminating at the Diridon Station. The Amtrak-Capitol Corridor, which provides daily service between Sacramento/Auburn and San José has 14 trains accessing the station. The Amtrak-Coast Starlight operates between Seattle and Los Angles, with 2 daily trains. In addition to the passenger trains utilizing Diridon Station, there are up to 10 freight trains that use the UPPR tracks east of the Caltrain tracks at the station on a daily basis[6]. The freight trains do not stop at Diridon Station.

Currently Caltrain trains use diesel locomotives. As part of the program to modernize operation of Caltrain, Caltrain is planning to electrify the Caltrain Corridor from San Francisco to San Jose and switch from diesel locomotives to use of electric trains in the near future.[7] Nearly all of the trains in the future are planned to be electric multiple unit (EMU) trains, which are self-propelled electric rail vehicles that can accelerate and decelerate at faster rates than diesel power trains, even with longer trains. This plan was formally adopted on January 8, 2015 and electrified service is anticipated to begin in 2020 or 2021.[8]

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[6] *Bay Area Regional Rail Plan, Technical Memorandum 4a, Conditions, Configuration & Traffic on Existing System*, Metropolitan Transportation Commission, November 15, 2006.
[7] Caltrain, 2014. *Peninsula Corridor Electrification Project. Final Environmental Impact Report*. December.
[8] Available online: http://www.caltrain.com/about/news/Caltrain_Board_Certifies_Final_Environmental_Impact_Report_and_Approves_Peninsula_Corridor_Electrification_Project.html. Accessed: June29, 2015.

Electrification of Caltrain would eliminate DPM emissions from these trains. Caltrain plans that in 2020 service between San Jose and San Francisco would use a mixed fleet of EMUs and diesel locomotives, with approximately 75% of the service being electric and 25% being diesel. In 2020, some peak service trains would be diesel on weekdays. All other service, including off-peak periods, would be EMU-based. Off-peak periods include early morning, midday, and after 7:00 p.m. After 2020, diesel locomotives would be replaced with EMUs over time as they reach the end of their service life. Caltrain's diesel-powered locomotives would continue to be used to provide service between the Diridon Station and Gilroy. It is expected that 100 percent of the San Jose to San Francisco fleet would be EMUs by 2026 to 2029.[9]

For calculation of emissions from Caltrain locomotives it was assumed that during 2018 and 2019 all trains would use diesel locomotives. During 2020 through 2024 there would be 14 daily trips, on an annual average basis, using diesel locomotives, and from 2025 on there would be two annual average daily trips with diesel locomotives between San Francisco and the Diridon Station. All trains used for freight service were assumed to use diesel powered locomotives.

DPM and $PM_{2.5}$ emissions from trains on the rail lines were calculated using EPA emission factors for locomotives[10] and CARB adjustment factors to account for fuels used in California[11]. Caltrain's current locomotive fleet consists of twenty-three 3,200 horsepower (hp) locomotives of model year or overhaul date of 1999 or earlier and six 3,600 hp locomotives of model year 2003.[12] The current fleet average locomotive engine size is about 3,285 hp. In estimating emissions for Caltrain locomotives in 2018 and 2019 the fleet average locomotive engine size of 3,285 hp was used. For emissions from 2020 on, the diesel locomotives that would still be operating were conservatively assumed to be the newer Caltrain locomotives with the 3,600 hp engines. For other passenger trains (ACE and Amtrak) it was assumed that these trains use 3,200 hp diesel locomotives and would continue to do so in the future. Each passenger train was assumed to use one locomotive and would be traveling at an average speed of 25 mph when north of The Alameda and in the vicinity of the project site. For passenger trains traveling south of The Alameda and at the Diridon Station and average speed of 10 mph was assumed. Emissions from freight trains bypassing the Diridon Station were calculated assuming they would use two locomotives with 2,300 hp engines (total of 4,600 hp) and would be traveling at about 40 mph.

Since the exposure duration used in calculating cancer risks is 70 years (in this case the period from 2018 through 2087), passenger and freight train average DPM emissions were calculated based on EPA emission factors for the period 2018-2040, with 2040 emissions assumed to be representative of years 2041 through 2087.

Modeling of locomotive emissions was conducted using the EPA's AERMOD dispersion model and five years (2006-2010) of hourly meteorological data from the San Jose Airport prepared for use with the AERMOD model by BAAQMD. Locomotive emissions from train travel within about 1,100 feet of the project site were modeled as a series of line sources comprised of a series of volume sources along the rail lines. Nine line sources were used to represent the rail lines used by passenger trains south of The Alameda and at the Diridon Station. One line source was

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[9] *Ibid*.
[10] *Emission Factors for Locomotives*, USEPA 2009 (EPA-420-F-09-025)
[11] *Offroad Modeling, Change Technical Memo*, Changes to the Locomotive Inventory, CARB July 2006.
[12] Caltrain *Commute Fleets*. Available at: http://www.caltrain.com/about/statsandreports.html. Accessed June 29, 2014.

used to represent the rail line used by freight trains, and one line source was used to represent the rail lines north of The Alameda used by passenger trains. The modeling included on-site receptors placed in the proposed residential areas of the project sites. Receptor heights of 9.9 meters (32 feet) and 13.1 meters (43 feet), representative of breathing heights on the third and fourth floor levels of the project. The third floor level would be the first level with residences. Figure 2 shows the railroad line segments used for the modeling and receptor locations at the project site where concentrations were calculated. The locations where the maximum modeled long-term DPM and $PM_{2.5}$ concentrations occurred at the project site are shown in Figure 2.

Maximum excess cancer risks at each project site were calculated from the maximum modeled long-term average DPM concentrations using methods recommended by BAAQMD.[13] The factors used to compute cancer risk are highly dependent on modeled concentrations, exposure period or duration, and the type of receptor. The exposure level is determined by the modeled concentration; however, it has to be averaged over a representative exposure period. The averaging period is dependent on many factors, but mostly the type of sensitive receptor that would reside at a site. This assessment conservatively assumed long-term residential exposures. BAAQMD has developed exposure assumptions for typical types of sensitive receptors. For residential exposures this includes nearly continuous exposure over 70 years for 24 hours per day. The cancer risk calculations for 70-year residential exposures reflect use of BAAQMD's most recent cancer risk calculation method, adopted in January 2010. This method applies BAAQMD recommended age sensitivity factors to the cancer risks to account for age sensitivity to toxic air contaminants. Age sensitivity factors reflect the greater sensitivity of infants and children to cancer-causing TACs. Details of the emission calculations, dispersion modeling and cancer risk calculations are contained in Appendix A.

The maximum increased cancer risk on the third floor level of the project was computed as 16.9 in one million and the maximum increased cancer risk on the fourth floor level was computed as 9.3 in one million. The location of maximum cancer risks are shown in Figure 1.1-2. Increased cancer risks at residences on the third floor level would range from 10.2 to 16.9 in one million. Increased cancer risks at residences on the fourth floor level would range from 7.0 to 9.3 in one million. Cancer risks on fifth floor and higher floor levels would be lower than those of the fourth floor. Under the BAAQMD CEQA Air Quality Guidelines, an incremental cancer risk of greater than 10.0 cases per million from a single source would be a significant impact. Since the projected maximum increased cancer risks on the third floor level would be above 10.0 in one million, this would be considered a significant impact for new occupants of the project.

Based on the rail line modeling, the maximum $PM_{2.5}$ concentration at the project site was 0.12 $\mu g/m^3$, occurring at the same receptors that had the maximum cancer risk. This concentration is below the BAAQMD $PM_{2.5}$ threshold of greater than 0.3 $\mu g/m^3$ and would nor be considered a significant impact.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). California's Office of Environmental Health and Hazard Assessment (OEHHA) has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The chronic inhalation REL for DPM is 5 $\mu g/m^3$. The maximum modeled annual residential DPM

[13] BAAQMD, 2010. *Air Toxics NSR Program Health Risk Screening Analysis (HSRA) Guidelines*. January.

concentration was 0.12 μg/m^3, which is lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.02 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0. The non-cancer health impacts from railroad DPM emissions would be below the BAAQMD significance threshold and would be considered a less than significant impact.

Based on the above, DPM emission from trains traveling near the project would have a significant impact with respect to increased cancer risk to new residents located on the third floor level of the proposed project.

Details of the modeling and risk calculations are included in Appendix A.

Project Mitigation of Railroad Impacts

DPM emissions from diesel locomotives traveling on the rail lines near the project site may pose a significant increase in cancer risk impacts to new project residents of the third floor level residential units. Mitigation would have to be incorporated into the project that would reduce increased cancer risk to 10.0 in one million or lower. Reducing cancer risk below 10.0 in one million would also reduce annual $PM_{2.5}$ exposure. When cancer risks are significant, the BAAQMD CEQA Air Quality Guidelines recommend as mitigation that projects install and maintain air filtration systems of fresh air supply. These systems should be installed on either an individual unit-by-unit basis, with individual air intakes and exhaust ducts ventilating each unit separately , or through a centralized building ventilation system.

The U.S. EPA reports particle size removal efficiency for filters rated MERV13 of 90 percent for particles in the size range of 1 to 3 μm and less than 75 percent for particles 0.3 to 1 μm[14,15]. Recent studies by the South Coast Air Quality Management District indicate that MERV13 filters could achieve reductions of about 60 percent for ultra-fine particles and about 35 percent for black carbon[16]. This same study found MERV16 filters reduced both ultrafine and black carbon particles by 85 percent or greater.

In 2012, CARB compiled a synthesis of the status of potential mitigation concepts to reduce exposure to nearby traffic air pollution.[17] Because mechanical ventilation has not been used in residential buildings until recently, there has been limited assessment of its impact on entry of particles and other pollutants into homes. CARB-reviewed studies of homes and schools have shown that high-efficiency filtration in mechanical ventilation systems can be effective in reducing levels of incoming outdoor particles. They noted that one study of residences in Northern California found that the homes with active filtration in a mechanical system had a notably lower portion of indoor particles from outdoors when the systems were on (filtration active) than when they were turned off (no filtration). In another study reviewed by CARB that

[14] American Society of Heating, Refrigerating and Air-Conditioning Engineers. 2007. *Method of testing general ventilation air-cleaning devices for removal efficiency by particle size*. ANSI/ASHRAE Standard 52.2-2007. Inc.
[15] U.S. EPA. 2009. *Residential Air Cleaners (Second Edition): A Summary of Available Information*. EPA 402-F-09-002. Revised August 2009.
[16] SCAQMD. 2009. *Pilot Study of High Performance Air Filtration for Classrooms Applications.* Draft Report October 2009
[17] California Air Resources Board (CARB), 2012, Status of Research on Potential Mitigation Concepts to Reduce Exposure to Nearby Traffic Pollution, August.

included modeling study of Korean residential units with mechanical ventilation, filters rated lower than MERV7 were insufficient for reducing contaminants that enter through the ventilation filter; the study concluded that filters should exceed MERV11. Another study reviewed by CARB found indoor submicron particle counts in a Utah school were reduced to just one-eighth of the outdoor levels in a building with a mechanical system using a MERV8 filter.

Based on these studies, it is assumed that MERV13 filtration could reduce ambient indoor particulate levels by 60 percent and MERV16 filtration could achieve an 85 percent reduction when compared to outdoor levels. Time spent outdoors would have to be factored into the overall effectiveness of these filtration systems. Studies indicate that the typical person spends approximately 87 percent of the time indoors, 8 percent outdoors, and 6 percent of the time in vehicles[18]. Assuming three hours of outdoor exposure to ambient DPM and 21 hours of indoor exposure to filtered air, the overall effective particulate control efficiency of filtration systems would be about 53 percent for MERV13 and 74 percent for MERV16 filtration systems.

Increased cancer risk at the project site would be mitigated to less than significant levels through use of ventilation systems with proper filtration (i.e., MERV13 through MERV 16). An ongoing maintenance plan for the building's air filtration system would be required to implement this measure. *Adherence to Mitigation AIR-2 would ensure that the proposed project reduces increased cancer risk caused by locomotive emissions to a level of less than significant*.

Mitigation Measures

AIR-2 The project shall include the following measures to minimize long-term toxic air contaminant (TAC) exposure for new project occupants. These measures are as follows:

1. Design buildings and site to limit exposure from sources of TAC emissions. The site layout shall locate windows and air intakes as far as possible from the Caltrain and Union Pacific Rail Road rail lines. Any modifications to the site design shall incorporate buffers between residences and the rail lines.

2. Install air filtration system(s) to service third floor residential units of the project. Air filtration devices shall be rated MERV13 or higher. To ensure adequate health protection to sensitive receptors, this ventilation system shall meet the following minimal design standards, following guidance from the Department of Public Health, City and County of San Francisco:[19]
    a. Use of MERV13 filters or of a MERV higher rating;
    b. At least one air exchange(s) per hour of fresh outside filtered air; and
    c. At least four air exchange(s) per hour recirculation.

    Alternatively, at the approval of the City, equivalent control technology may be used if it is shown by a qualified air quality consultant or heating, ventilation, and air

[18] US Environmental Protection Agency (US EPA), 1996. The National Human Activity Pattern Survey. National Exposure Research Laboratory

[19] Department of Public Health, City and County of San Francisco, 2008, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, May.

conditioning (HVAC) engineer that it would reduce risk to below significant thresholds.

3. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required. Recognizing that emissions from air pollution sources are decreasing, the maintenance period shall last as long as significant excess cancer risk or annual $PM_{2.5}$ exposures are predicted. Subsequent studies could be conducted by an air quality expert approved by the City to identify the ongoing need for the filtered ventilation systems as future information becomes available.

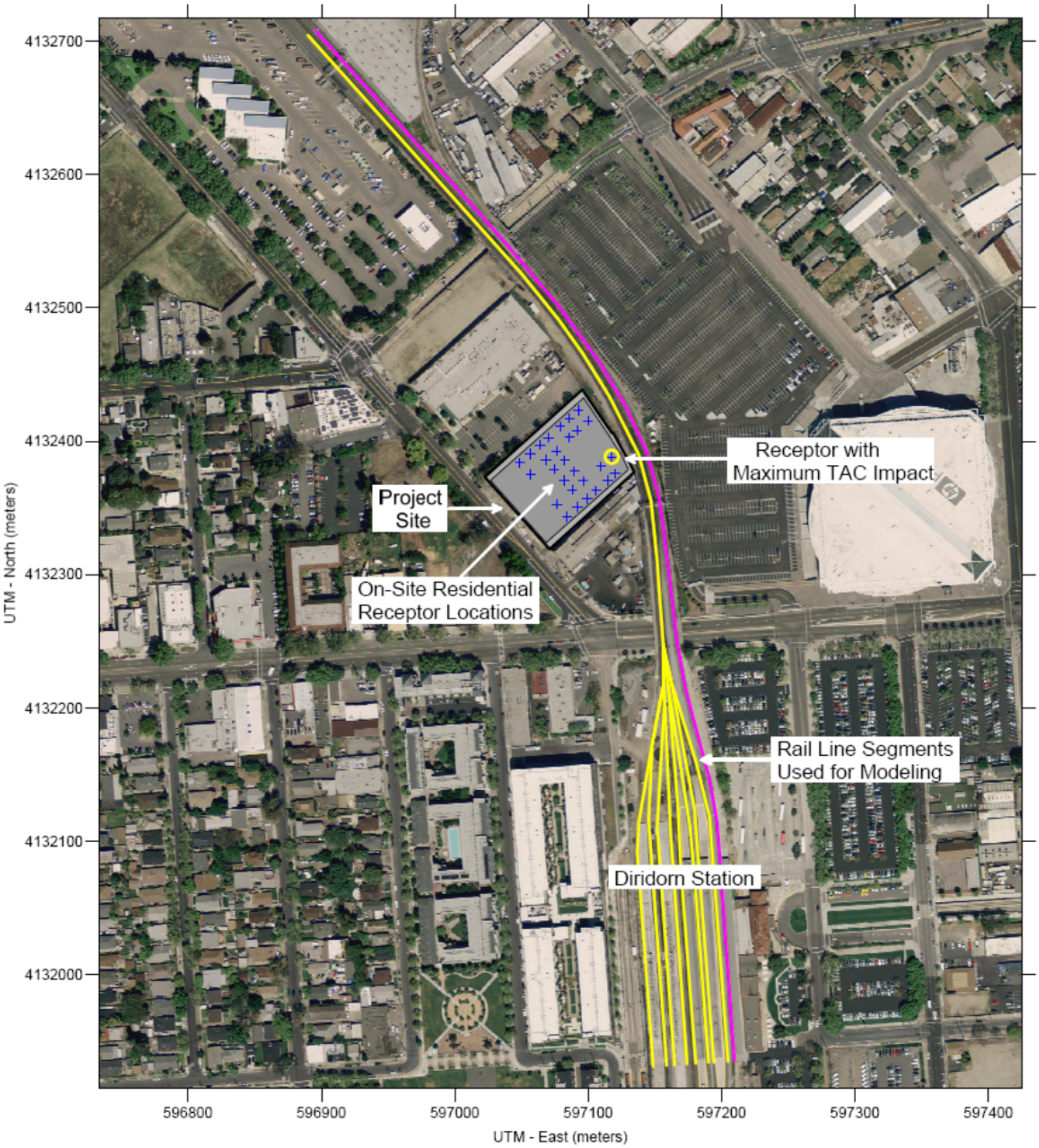
4. Ensure that the use agreement and other property documents (1) require cleaning, maintenance, and monitoring of the affected buildings for air flow leaks; (2) include assurance that new owners or tenants are provided information on the ventilation system; and (3) include provisions that fees associated with owning or leasing a unit(s) in the building include funds for cleaning, maintenance, monitoring, and replacements of the filters, as needed.

<u>Significance After Mitigation</u>

A properly installed and operated ventilation system with MERV13 air filters may reduce $PM_{2.5}$ concentrations from DPM mobile and stationary sources by approximately 60 percent indoors when compared to outdoors. Increased cancer risks for MERV13 filtration were calculated assuming a combination of outdoor and indoor exposure. For use of MERV13 filtration systems, without the additional use of sealed, inoperable widows and no balconies, 3 hours of outdoor exposure to ambient DPM concentrations and 21 hours of indoor exposure to filtered air was assumed. In this case, the effective control efficiency using a MERV13 filtration system is about 52.5 percent.

The projected cancer risk associated with use of a MERV13 filtration system would be 8.0 in one million at the location of the maximum unmitigated cancer risk (16.9 in one million). With use of project-specified air filtration systems, exposure to cancer risk throughout the project site would be reduced to levels below the BAAQMD significance threshold.

Figure 1.1-2
On-Site Receptor Locations, Rail Segments Modeled, and Location of Maximum Impact



1.1.3.4 Objectionable Odors
During construction, the various diesel-powered vehicles and equipment in use onsite would create localized odors. These odors would be temporary and not likely to be noticeable for extended periods of time much beyond the project's site boundaries. Operation of the project is not anticipated to produce any offensive odors compared to existing operations; therefore, odor effects during project operations are considered a less-than-significant impact.

Greenhouse Gases

1.2 Setting

Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere from space and a portion of the radiation is absorbed by the Earth's surface. The Earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect.

Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for enhancing the greenhouse effect (Ahrens 2003). Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (California Energy Commission 2006a). A byproduct of fossil fuel combustion is CO_2. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills. Processes that absorb and accumulate CO_2, often called CO_2 "sinks," include uptake by vegetation and dissolution into the ocean.

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are of regional and local concern, respectively. California is the 12th to 16th largest emitter of CO_2 in the world (California Energy Commission 2006a). Carbon dioxide equivalents (CO_2e) is a measurement used to account for the fact that various GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential of a GHG, is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

1.2.1 Regulatory Environment

This section describes recent state regulations that specifically address greenhouse gas emissions and global climate change. At the time of writing, there are no federal regulations setting ambient air quality standards or emission limits for greenhouse gases except overall California emission limits set by Assembly Bill 32 (AB32) as described below.

1.2.2 State

Assembly Bill 1493

In 2002, Assembly Bill (AB) 1493 was passed requiring that the California Air Resources Board (CARB) develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty truck and other vehicles determined by the ARB to be vehicles whose primary use is noncommercial personal transportation in the state.”

Executive Order S-3-05

Executive Order S-3-05, signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra’s snow pack, further exacerbate California’s air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary must also submit biannual reports to the governor and state legislature describing: 1) progress made toward reaching the emission targets; 2) impacts of global warming on California’s resources; and 3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created a Climate Act Team (CAT) made up of members from various state agencies and commission.

Assembly Bill 32, the California Climate Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32. AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Senate Bill 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (PUC) to establish a greenhouse gas emission performance standard. Therefore, on January 25, 2007, the PUC adopted an interim GHG Emissions Performance Standard in an effort to help mitigate climate change. The Emissions Performance Standard is a facility-based emissions standard requiring that all new long-term commitments for baseload generation to serve California consumers be with power plants that have emissions no greater than a combined cycle gas turbine plant. That level is established at 1,100 pounds of CO_2 per megawatt-hour. "New long-term commitment" refers to new plant investments (new construction), new or renewal contracts with a term of five years or more, or major investments by the utility in its existing baseload power plants. In addition, the California Energy Commission (CEC) established a similar standard for local publicly owned utilities that cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural gas fired plant. On July 29, 2007, the Office of Administrative Law disapproved the Energy Commission's proposed Greenhouse Gases Emission Performance Standard rulemaking action and subsequently, the CEC revised the proposed regulations. SB 1368 further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

1.2.3 Local

BAAQMD

As described in Air Quality, the District has determined that it is appropriate to rely on the significance thresholds identified in the BAAQMD's CEQA guidelines (updated May 2012) for determining this project's impacts from GHG emissions.

The BAAQMD takes a tiered approach to consideration of operational GHG emissions. The operational GHG significance level established by the BAAQMD per its CEQA guidelines is 1,100 metric tons (MT) of carbon dioxide (CO_2) equivalent per year for projects not classified as stationary sources (as per the May 2010 proposed guidelines). Projects consistent with a qualified Climate Action Plan adopted by the local jurisdiction (or similar adopted policies, ordinances and programs) that include enforceable measures to reduce GHG emissions consistent with AB 32 goals or Executive Order S-03-05 targets, would also be considered less than significant.

The BAAQMD recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include, but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

1.2.4 GHG Assessment

The CalEEMod emissions model was used to estimate the GHG operational emissions for the proposed project. CalEEMod is a statewide land use emissions computer model developed to provide a uniform platform to quantify potential greenhouse gas emissions. The proposed 1st operational year was assumed to be 2017. The input and output files for the CalEEMod computer analysis are attached.

Projects not consistent with an adopted qualified Climate Action Plan (or similar adopted policies, ordinances and programs) would be considered to have a significant impact.

Projects proposed in areas where a qualified Climate Action Plan has not been adopted are typically reviewed against a "bright-line" threshold of 1,100 MT carbon dioxide equivalent per year (CO_2e/yr) or 4.6 MT CO_2e/SP/yr per resident (residents+employees). A bright line numeric threshold of 1,100 MT CO_2e/yr or 4.6 MT CO_2e/SP/yr is low and is therefore, a conservative significance level in which to gauge future projects needs for mitigation under CEQA.

Based on the results of the GHG evaluation, operation of the project would generate 3.73 MT CO_2e/SP/yr which is below the threshold of significance of 4.6 MT CO_2e/SP/yr. Therefore, the project would be considered insignificant for GHG under CEQA.

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Appendix A
Support Data

138 Stockton Construction Risk
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meter height

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged.

10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)
1	1	2016	0.0301	10	2.64	2016	0.030119	1	0.14
2	1	2017	0.0140	10	1.23	2017	0.014026	1	0.06
3	1	2015	0.0000	4.75	0.00	2015	0.000000	1	0.00
4	1	2016	0.0000	3	0.00	2016	0.000000	1	0.00
5	1	2017	0.0000	3	0.00	2017	0.000000	1	0.00
6	1	2018	0.0000	3	0.00	2018	0.000000	1	0.00
7	1	2019	0.0000	3	0.00	2019	0.000000	1	0.00
8	1	2020	0.0000	3	0.00	2020	0.000000	1	0.00
9	1		0.0000	3	0.00		0.0000	1	0.00
10	1		0.0000	3	0.00		0.0000	1	0.00
11	1		0.0000	3	0.00		0.0000	1	0.00
12	1		0.0000	3	0.00		0.0000	1	0.00
13	1		0.0000	3	0.00		0.0000	1	0.00
14	1		0.0000	3	0.00		0.0000	1	0.00
15	1		0.0000	3	0.00		0.0000	1	0.00
16	1		0.0000	3	0.00		0.0000	1	0.00
17	1		0.0000	1.5	0.00		0.0000	1	0.00
18	1		0.0000	1	0.00		0.0000	1	0.00
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
65	1		0.0000	1	0.00		0.0000	1	0.00
66	1		0.0000	1	0.00		0.0000	1	0.00
67	1		0.0000	1	0.00		0.0000	1	0.00
68	1		0.0000	1	0.00		0.0000	1	0.00
69	1		0.0000	1	0.00		0.0000	1	0.00
70	1		0.0000	1	0.00		0.0000	1	0.00
Total Increased Cancer Risk					**3.86**				**0.20**

138 Stockton

Construction Health Impact Summary

	Maximum Concentrations					Maximum
Construction Year	Exhaust PM2.5/DPM (µg/m^3)	Fugitive PM2.5 (µg/m^3)	Cancer Risk (per million) Child	Cancer Risk (per million) Adult	Hazard Index (-)	Annual PM2.5 Concentration (µg/m^3)
2016	0.0301	0.0137	2.6	0.1	0.006	0.044
2017	0.0140	0.0070	1.2	0.1	0.003	0.021
2015	0.0000	0.0000	0.0	0.0	0.000	0.000
2016	0.0000	0.0000	0.0	0.0	0.000	0.000
2017	0.0000	0.0000	0.0	0.0	0.000	0.000
2018	0.0000	0.0000	0.0	0.0	0.000	0.000
2019	0.0000	0.0000	0.0	0.0	0.000	0.000
2020	0.0000	0.0000	0.0	0.0	0.000	0.000
Total	-	-	**3.9**	**0.2**	-	-
Maximum Annual	0.0301	0.0137	-	-	**0.006**	**0.044**

138 Stockton Ave, San Jose, CA
PM2.5 Modeling - Rail Line Information and PM2.5 Emission Rates
2018 - 2087 DPM (PM2.5) Emissions

Year	Description	No. Lines	No. Diesel Trains per Day	Train Travel Speed (mph)	PM 2.5 Average Daily Emission Rate (g/mi/day)
2018-2019	Caltrain - Station	8	75	10	800.7
	Other Passenger - Station	8	22	10	224.5
	Caltrain - North of Station	1	75	25	320.3
	Other Passenger - North of Station	1	22	25	89.8
	Freight Trains	1	10	40	58.6
	Total	**9**	**107**	**-**	**-**
2020-2024	Caltrain - Station	8	14	10	117.3
	Other Passenger - Station	8	22	10	166.8
	Caltrain - North of Station	1	14	25	46.9
	Other Passenger - North of Station	1	22	25	66.7
	Freight Trains	1	10	40	45.5
	Total	**9**	**45**	**-**	**-**
2025+	Caltrain - Station	8	2	10	3.9
	Other Passenger - Station	8	22	10	37.2
	Caltrain - North of Station	1	2	25	1.5
	Other Passenger - North of Station	1	22	25	14.9
	Freight Trains	1	10	40	11.9
	Total	**9**	**34**	**-**	**-**

Notes: Emission based on Emission Factors for Locomotives, USEPA 2009 (EPA-420-F-09-025)
Average emissions calculated for periods 2018-2019, 2020-2024, and 2025-2087
Fuel correction factors from Offroad Modeling Change Technical memo, Changes to the Locomotive Inventory, CARB July 2006.
DPM & PM2.5 calculated as 97% of PM10 emissions (CARB CEIDERS PM2.5 fractions)
25% of Caltrain trains assumed to be diesel in 2020. This represents about 7 or 8 trains of the current rolling stock of 29 trains. These will be operated only during weekday peak periods.
After 2025 it is assumed that on an annual average basis there would be 2 diesel train trips per day between San Francisco and San Jose.
Passenger trains assumed to operate for 24 hours per day
Freight trains assumed to operate for 24 hours per day

Caltrain - with electrification			
Arrive/Depart Station	*Diesel*	*Electric*	*Total*
Passenger trains - weekday =	19	73	92
Passenger trains - weekend =	0	32	32
Passenger trains - Sat only =	0	4	4
Total Trains =	19	109	128
Annual average daily trains =	14	62	75
Locomotive horsepower =	3285	(before 2020)	
Locomotive horsepower =	3600	(2020 and later)	
Locomotives per train =	1		
Locomotive engine load =	0.4		
Freight	*Diesel*		
Freight trains per day =	10	7	days/week
Locomotive horsepower =	2300		
Locomotives per train =	2		
Total horsepower =	4600		
Locomotive engine load =	0.5		

note: average hp for UPRR locomotive in CA in 2009 was 2,200 hp

Other Passenger Trains*	
Arrive/Depart Station	*Diesel*
Passenger trains - weekday =	24
Passenger trains - weekend =	16
Passenger trains - Sat only =	0
Total Trains =	40
Annual average daily trains =	22
Locomotive horsepower =	3200
Locomotives per train =	1
Locomotive engine load =	0.4

* Includes ACE, Capitol Corridor, and Coast Starlight trains

Average Locomotive PM Emission Factors (g/hp-hr)

Train Type	2018-2019	2020-2024	2025+
Passenger	0.118	0.088	0.020
Freight	0.125	0.097	0.025

2025+ emissions are average for 2025-2087.

PM2.5 to PM ratio = 0.97

	CARB Fuel Adj Factor	
	2010	2011+
Passenger	0.717	0.709
Freight	0.851	0.840

138 Stockton Ave, San Jose, CA- Rail Line Emissions at/near Diridon Station
DPM Modeling - Rail Line Information and DPM and PM2.5 Emission Rates

Year	Description	Track No.	Link Width (ft)	Link Width (m)	Link Length (ft)	Link Length (m)	Link Length (miles)	Release Height (m)	No. Diesel Trains per Day per Track	Train Travel Speed (mph)	Average Daily Emission Rate per Train (g/mi/day)	Average Daily Emission Rate (g/day)	Link Emission Rate (g/s)	Link Emission Rate (lb/hr)
2018-2019	Tracks at Station	2	10	3.0	1,043	318.0	0.20	5	12	10	10.6	25.3	2.93E-04	2.33E-03
		3	10	3.0	1,148	349.8	0.22	5	12	10	10.6	27.9	3.22E-04	2.56E-03
		4	10	3.0	1,034	315.1	0.20	5	12	10	10.6	25.1	2.90E-04	2.30E-03
		5	10	3.0	938	285.9	0.18	5	12	10	10.6	22.8	2.64E-04	2.09E-03
		6	10	3.0	1,034	315.2	0.20	5	12	10	10.6	25.1	2.91E-04	2.31E-03
		7	10	3.0	1,037	316.0	0.20	5	12	10	10.6	25.2	2.91E-04	2.31E-03
		8	10	3.0	1,041	317.2	0.20	5	12	10	10.6	25.3	2.92E-04	2.32E-03
		9	10	3.0	1,046	318.9	0.20	5	12	10	10.6	25.4	2.94E-04	2.33E-03
	Station Total						**1.58**					**202.0**	**2.34E-03**	**1.86E-02**
	Tracks North of Station	10	10	3.0	1,792	546.2	**0.34**	5	97	25	4.2	**139.2**	**1.61E-03**	**1.28E-02**
	UPRR Rail Line	1	10	3.0	2,842	866.2	**0.54**	5	10	40	5.9	**31.5**	**3.65E-04**	**2.90E-03**
2020-2024	Tracks at Station	2	10	3.0	1,043	318.0	0.20	5	4	10	8.1	7.0	8.12E-05	6.45E-04
		3	10	3.0	1,148	349.8	0.22	5	4	10	8.1	7.7	8.93E-05	7.09E-04
		4	10	3.0	1,034	315.1	0.20	5	4	10	8.1	7.0	8.05E-05	6.39E-04
		5	10	3.0	938	285.9	0.18	5	4	10	8.1	6.3	7.30E-05	5.80E-04
		6	10	3.0	1,034	315.2	0.20	5	4	10	8.1	7.0	8.05E-05	6.39E-04
		7	10	3.0	1,037	316.0	0.20	5	4	10	8.1	7.0	8.07E-05	6.40E-04
		8	10	3.0	1,041	317.2	0.20	5	4	10	8.1	7.0	8.10E-05	6.43E-04
		9	10	3.0	1,046	318.9	0.20	5	4	10	8.1	7.0	8.14E-05	6.46E-04
	Station Total						**1.58**					**56.0**	**6.48E-04**	**5.14E-03**
	Tracks North of Station	10	10	3.0	1,792	546.2	**0.34**	5	35	25	3.2	**38.6**	**4.46E-04**	**3.54E-03**
	UPRR Rail Line	1	10	3.0	2,842	866.2	**0.54**	5	10	40	4.5	**24.5**	**2.83E-04**	**2.25E-03**
2025+	Tracks at Station	2	10	3.0	1,043	318.0	0.20	5	3	10	1.7	1.0	1.18E-05	9.33E-05
		3	10	3.0	1,148	349.8	0.22	5	3	10	1.7	1.1	1.29E-05	1.03E-04
		4	10	3.0	1,034	315.1	0.20	5	3	10	1.7	1.0	1.16E-05	9.24E-05
		5	10	3.0	938	285.9	0.18	5	3	10	1.7	0.9	1.06E-05	8.39E-05
		6	10	3.0	1,034	315.2	0.20	5	3	10	1.7	1.0	1.16E-05	9.25E-05
		7	10	3.0	1,037	316.0	0.20	5	3	10	1.7	1.0	1.17E-05	9.27E-05
		8	10	3.0	1,041	317.2	0.20	5	3	10	1.7	1.0	1.17E-05	9.30E-05
		9	10	3.0	1,046	318.9	0.20	5	3	10	1.7	1.0	1.18E-05	9.35E-05
	Station Total						**1.58**					**8.1**	**9.37E-05**	**7.44E-04**
	Tracks North of Station	10	10	3.0	1,792	546.2	**0.34**	5	24	25	0.7	**5.6**	**6.46E-05**	**5.13E-04**
	UPRR Rail Line	1	10	3.0	2,842	866.2	**0.54**	5	10	40	1.2	**6.4**	**7.44E-05**	**5.90E-04**

138 Stockton Ave, San Jose, CA
AERMOD Railroad DPM Risk Modeling Parameters and Maximum Cancer Risk st Project Site
Third Floor Residences (receptor height = 9.88 meters)

Number of Receptors	-
Receptor Spacing =	variable
Receptor Height =	9.88 m

Meteorological Conditions

San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air (μg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

Exposure Type	Value[1] DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
URF =Unit risk factor (cancer risk per μg/m^3)

Unit Risk Factors (unadjusted for age sensitivity) for DPM

Exposure Type	CPF (mg/kg-day)$^{-1}$	*DPM*
Residential (70-Yr Exposure)	1.10E+00	318.5

MEI Cancer Risk Calculations

Meteorological Data Year	Maximum Annual DPM Concentration (μg/m^3) 2018-2019	2020-2024	2025+
2006-2010	0.1236	0.0402	0.0069
Cancer Risk[a]	39.36	12.80	2.20
Sensitivity Weighting Factors	0.286	0.239	1.164
Contribution to Total Cancer Risk	11.25	3.1	2.6
70-yr Cumulative Risk [b]	***16.87***		

Notes:
Receptor Heights = 9.88 m
Maximum DPM & PM2.5 concentrations occur at the northeast corner of residential area closest to the rail lines
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time.

138 Stockton Ave, San Jose, CA
AERMOD Railroad DPM Risk Modeling Parameters and Maximum Cancer Risk st Project Site
Third Floor Residences (receptor height = 9.88 meters)

Number of Receptors	28
Receptor Spacing =	variable
Receptor Height =	9.88 m

Meteorological Conditions

San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
URF =Unit risk factor (cancer risk per $\mu g/m^3$)

Unit Risk Factors (unadjusted for age sensitivity) for DPM

Exposure Type	**CPF $(mg/kg\text{-}day)^{-1}$**	***DPM***
Residential (70-Yr Exposure)	1.10E+00	318.5

MEI Cancer Risk Calculations

				2018 - 2019				**2020 - 2024**				**2025 - 2087**			
Receptor No.	UTM-X (m)	UTM-Y (m)	**70-yr Total Cumulative Risk[b]**	Conc ($\mu g/m^3$)	Cancer Risk[a]	Sensitivity Weighting Factors	Contribution to Total Cancer Risk	Conc ($\mu g/m^3$)	Cancer Risk[a]	Sensitivity Weighting Factors	Contribution to Total Cancer Risk	Conc ($\mu g/m^3$)	Cancer Risk[a]	Sensitivity Weighting Factors	Contribution to Total Cancer Risk
1	597117.67	4132388.28	**16.87**	0.12357	39.36	0.286	11.25	0.04017	12.80	0.239	3.06	0.00691	2.20	1.164	2.56
2	597109.49	4132381.03	**15.24**	0.11185	35.63	0.286	10.18	0.03622	11.54	0.239	2.76	0.00621	1.98	1.164	2.30
3	597120.11	4132375.65	**16.52**	0.12112	38.58	0.286	11.02	0.0393	12.52	0.239	3.00	0.00675	2.15	1.164	2.50
4	597114.58	4132370.55	**15.51**	0.11389	36.28	0.286	10.37	0.03684	11.74	0.239	2.81	0.00631	2.01	1.164	2.34
5	597099.79	4132415.28	**15.84**	0.11598	36.95	0.286	10.56	0.03774	12.02	0.239	2.88	0.0065	2.07	1.164	2.41
6	597091.61	4132408.03	**14.26**	0.10458	33.31	0.286	9.52	0.03391	10.80	0.239	2.58	0.00582	1.85	1.164	2.16
7	597086.01	4132402.93	**13.44**	0.09871	31.44	0.286	8.98	0.03191	10.16	0.239	2.43	0.00546	1.74	1.164	2.03
8	597092.68	4132423.25	**15.35**	0.1124	35.80	0.286	10.23	0.03657	11.65	0.239	2.79	0.00629	2.00	1.164	2.33
9	597086.01	4132417.37	**14.08**	0.10325	32.89	0.286	9.40	0.0335	10.67	0.239	2.55	0.00575	1.83	1.164	2.13
10	597079.11	4132411.05	**13.07**	0.09595	30.56	0.286	8.73	0.03102	9.88	0.239	2.36	0.00531	1.69	1.164	1.97
11	597070.13	4132402.79	**12.03**	0.08856	28.21	0.286	8.06	0.02849	9.08	0.239	2.17	0.00485	1.54	1.164	1.80
12	597063.80	4132397.20	**11.43**	0.0843	26.85	0.286	7.67	0.02702	8.61	0.239	2.06	0.00458	1.46	1.164	1.70
13	597056.53	4132390.68	**10.83**	0.07999	25.48	0.286	7.28	0.02553	8.13	0.239	1.95	0.00432	1.38	1.164	1.60
14	597048.66	4132383.79	**10.25**	0.07584	24.16	0.286	6.90	0.02411	7.68	0.239	1.84	0.00406	1.29	1.164	1.51
15	597056.81	4132375.12	**10.66**	0.07892	25.14	0.286	7.18	0.02507	7.99	0.239	1.91	0.00422	1.34	1.164	1.57
16	597076.09	4132392.73	**12.27**	0.09039	28.79	0.286	8.23	0.02904	9.25	0.239	2.21	0.00494	1.57	1.164	1.83
17	597082.24	4132385.84	**12.63**	0.09302	29.63	0.286	8.47	0.02988	9.52	0.239	2.28	0.00508	1.62	1.164	1.88
18	597089.65	4132377.50	**13.09**	0.09644	30.72	0.286	8.78	0.03098	9.87	0.239	2.36	0.00527	1.68	1.164	1.95
19	597096.07	4132370.28	**13.53**	0.09969	31.76	0.286	9.07	0.03202	10.20	0.239	2.44	0.00544	1.73	1.164	2.02
20	597088.11	4132363.71	**12.77**	0.09427	30.03	0.286	8.58	0.03012	9.59	0.239	2.30	0.0051	1.62	1.164	1.89
21	597081.92	4132370.65	**12.36**	0.09125	29.07	0.286	8.31	0.02916	9.29	0.239	2.22	0.00494	1.57	1.164	1.83
22	597074.51	4132379.08	**11.91**	0.08793	28.01	0.286	8.00	0.02811	8.95	0.239	2.14	0.00476	1.52	1.164	1.77
23	597068.41	4132385.93	**11.57**	0.08539	27.20	0.286	7.77	0.02731	8.70	0.239	2.08	0.00462	1.47	1.164	1.71
24	597105.81	4132363.02	**14.34**	0.10556	33.63	0.286	9.61	0.03395	10.81	0.239	2.59	0.00578	1.84	1.164	2.14
25	597099.19	4132357.10	**13.63**	0.10059	32.04	0.286	9.16	0.0322	10.26	0.239	2.45	0.00546	1.74	1.164	2.03
26	597092.07	4132350.49	**12.98**	0.09599	30.58	0.286	8.74	0.03057	9.74	0.239	2.33	0.00516	1.64	1.164	1.91
27	597084.15	4132343.41	**12.33**	0.09139	29.11	0.286	8.32	0.02895	9.22	0.239	2.21	0.00486	1.55	1.164	1.80
28	597076.47	4132352.82	**11.80**	0.08747	27.86	0.286	7.96	0.02774	8.84	0.239	2.11	0.00466	1.48	1.164	1.73
Maximum Cancer Risk			**16.9**												

Notes:
Receptor Heights = 9.88 m
Maximum DPM & PM2.5 concentrations occur at the northeast corner of residential area closest to the rail lines
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time.

138 Stockton Ave, San Jose, CA
AERMOD Railroad DPM Risk Modeling Parameters and Maximum Cancer Risk st Project Site
Fourth Floor Residences (receptor height = 13.1 meters)

Number of Receptors	-
Receptor Spacing =	variable
Receptor Height =	13.1 m

<u>Meteorological Conditions</u>

San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

1 Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
URF =Unit risk factor (cancer risk per $\mu g/m^3$)

Unit Risk Factors (unadjusted for age sensitivity) for DPM

Exposure Type	CPF $(mg/kg\text{-}day)^{-1}$	***DPM***
Residential (70-Yr Exposure)	1.10E+00	318.5

MEI Cancer Risk Calculations

Meteorological Data Year	Maximum Annual DPM Concentration ($\mu g/m^3$) 2018-2019	2020-2024	2025+
2006-2010	0.0680	0.0221	0.0038
Cancer Risk[a]	21.67	7.03	1.21
Sensitivity Weighting Factors	0.286	0.239	1.164
Contribution to Total Cancer Risk	6.19	1.7	1.4
70-yr Cumulative Risk [b]	***9.28***		

Notes:
Receptor Heights = 13.1 m
Maximum DPM & PM2.5 concentrations occur at the northeast corner of residential area closest to the rail lines
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time.

138 Stockton Ave, San Jose, CA
AERMOD Railroad DPM Risk Modeling Parameters and Maximum Cancer Risk st Project Site
Third Floor Residences (receptor height = 9.88 meters)

Number of Receptors	28
Receptor Spacing =	variable
Receptor Height =	9.88 m

Meteorological Conditions

San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
SWFi = Sensitivity weighting factor dependent on emissions period i and duration of exposure
URF =Unit risk factor (cancer risk per $\mu g/m^3$)

Unit Risk Factors (unadjusted for age sensitivity) for DPM

Exposure Type	**CPF $(mg/kg\text{-}day)^{-1}$**	***DPM***
Residential (70-Yr Exposure)	1.10E+00	318.5

MEI Cancer Risk Calculations

				2018 - 2019				2020 - 2024				2025 - 2087			
Receptor No.	UTM-X (m)	UTM-Y (m)	**70-yr Total Cumulative Risk[b]**	Conc ($\mu g/m^3$)	Cancer Risk[a]	Sensitivity Weighting Factors	Contribution to Total Cancer Risk	Conc ($\mu g/m^3$)	Cancer Risk[a]	Sensitivity Weighting Factors	Contribution to Total Cancer Risk	Conc ($\mu g/m^3$)	Cancer Risk[a]	Sensitivity Weighting Factors	Contribution to Total Cancer Risk
1	597117.67	4132388.28	**9.28**	0.06803	21.67	0.286	6.19	0.02207	7.03	0.239	1.68	0.00379	1.21	1.164	1.41
2	597109.49	4132381.03	**8.93**	0.06559	20.89	0.286	5.97	0.02118	6.75	0.239	1.61	0.00362	1.15	1.164	1.34
3	597120.11	4132375.65	**9.18**	0.0674	21.47	0.286	6.13	0.02182	6.95	0.239	1.66	0.00374	1.19	1.164	1.39
4	597114.58	4132370.55	**8.97**	0.06597	21.01	0.286	6.00	0.02128	6.78	0.239	1.62	0.00363	1.16	1.164	1.35
5	597099.79	4132415.28	**9.10**	0.0667	21.25	0.286	6.07	0.02165	6.90	0.239	1.65	0.00372	1.18	1.164	1.38
6	597091.61	4132408.03	**8.67**	0.06367	20.28	0.286	5.79	0.02058	6.56	0.239	1.57	0.00352	1.12	1.164	1.31
7	597086.01	4132402.93	**8.40**	0.06179	19.68	0.286	5.62	0.01991	6.34	0.239	1.52	0.00339	1.08	1.164	1.26
8	597092.68	4132423.25	**8.98**	0.06579	20.96	0.286	5.99	0.02135	6.80	0.239	1.63	0.00367	1.17	1.164	1.36
9	597086.01	4132417.37	**8.61**	0.0632	20.13	0.286	5.75	0.02044	6.51	0.239	1.56	0.0035	1.11	1.164	1.30
10	597079.11	4132411.05	**8.26**	0.06076	19.35	0.286	5.53	0.01958	6.24	0.239	1.49	0.00334	1.06	1.164	1.24
11	597070.13	4132402.79	**7.86**	0.05792	18.45	0.286	5.27	0.01857	5.92	0.239	1.42	0.00315	1.00	1.164	1.17
12	597063.80	4132397.20	**7.59**	0.05608	17.86	0.286	5.10	0.01792	5.71	0.239	1.37	0.00303	0.97	1.164	1.12
13	597056.53	4132390.68	**7.31**	0.05406	17.22	0.286	4.92	0.01721	5.48	0.239	1.31	0.0029	0.92	1.164	1.08
14	597048.66	4132383.79	**7.01**	0.05197	16.55	0.286	4.73	0.01648	5.25	0.239	1.26	0.00277	0.88	1.164	1.03
15	597056.81	4132375.12	**7.22**	0.05352	17.05	0.286	4.87	0.01696	5.40	0.239	1.29	0.00285	0.91	1.164	1.06
16	597076.09	4132392.73	**7.96**	0.05872	18.71	0.286	5.34	0.01881	5.99	0.239	1.43	0.00319	1.02	1.164	1.18
17	597082.24	4132385.84	**8.11**	0.05978	19.04	0.286	5.44	0.01915	6.10	0.239	1.46	0.00325	1.04	1.164	1.21
18	597089.65	4132377.50	**8.28**	0.06107	19.45	0.286	5.56	0.01956	6.23	0.239	1.49	0.00332	1.06	1.164	1.23
19	597096.07	4132370.28	**8.43**	0.06218	19.81	0.286	5.66	0.01992	6.35	0.239	1.52	0.00338	1.08	1.164	1.25
20	597088.11	4132363.71	**8.15**	0.06027	19.20	0.286	5.49	0.01922	6.12	0.239	1.47	0.00324	1.03	1.164	1.20
21	597081.92	4132370.65	**7.99**	0.0591	18.83	0.286	5.38	0.01884	6.00	0.239	1.44	0.00318	1.01	1.164	1.18
22	597074.51	4132379.08	**7.81**	0.05772	18.39	0.286	5.25	0.01841	5.86	0.239	1.40	0.00311	0.99	1.164	1.15
23	597068.41	4132385.93	**7.66**	0.0566	18.03	0.286	5.15	0.01805	5.75	0.239	1.38	0.00305	0.97	1.164	1.13
24	597105.81	4132363.02	**8.67**	0.06394	20.37	0.286	5.82	0.02051	6.53	0.239	1.56	0.00348	1.11	1.164	1.29
25	597099.19	4132357.10	**8.46**	0.06246	19.90	0.286	5.68	0.01995	6.36	0.239	1.52	0.00337	1.07	1.164	1.25
26	597092.07	4132350.49	**8.22**	0.06087	19.39	0.286	5.54	0.01936	6.17	0.239	1.48	0.00326	1.04	1.164	1.21
27	597084.15	4132343.41	**7.96**	0.05903	18.80	0.286	5.37	0.01868	5.95	0.239	1.42	0.00313	1.00	1.164	1.16
28	597076.47	4132352.82	**7.74**	0.05743	18.29	0.286	5.23	0.01819	5.79	0.239	1.39	0.00305	0.97	1.164	1.13
Maximum Cancer Risk			**9.3**	0.06803				0.02207				0.00379			

Notes:
Receptor Heights = 9.88 m
Maximum DPM & PM2.5 concentrations occur at the northeast corner of residential area closest to the rail lines
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time.